

1-86. (CANCELED)

87. (NEW) A method of forming an implantable tissue construct for replacement for a human body part, comprising:

a) forming an inert material into a porous support structure having a shape and size corresponding to the shape and size of the human body part to be replaced;

b) encapsulating the entire porous support structure by means of a boundary layer of cell-impermeable material;

c) introducing the living cells into the porous support structure which constitutes a cell culture chamber;

d) promoting cell growth by introducing nutrients and oxygen to the living cells into said porous support structure; and

e) removing the boundary layer after completion of the cell-formation process or of the implant formed by the cells; thereby producing an implantable tissue construct which corresponds to the shape and size of the human body part to be replaced.

88. (NEW) The method according to claim 87, further comprising the step of eliminating the porous support structure (1) upon completion of forming the implantable tissue construct by either mechanically removing, or biologically converting the support structure.

89. (NEW) The method according to claim 87, wherein the inert material used to form the porous support structure is phosphate.

90. (NEW) The method according to claim 87, wherein the cell-impermeable boundary layer (4) is a biological material or a synthetic material.

91. (NEW) The method according to claim 90, wherein the cell-impermeable boundary layer (4) is a hydrogel material.

92. (NEW) The method according to claim 87, wherein the cell-impermeable boundary layer material (4) is gas permeable.

93. (NEW) The method according to claim 87, further comprising the step of applying the boundary layer (4), which is impermeable to the cells, to the porous support structure by one of spraying and dipping in a bath (3).

94. (NEW) The method according to claim 87, further comprising the step of forming an intermediate layer, between the porous support structure (1) and the boundary layer (4), from a material which remains unbound to the support structure (1) so that the intermediate layer facilitates removal of the boundary layer from the porous support structure following production of one of the implant and prosthesis.

95. (NEW) The method according to claim 94, wherein the intermediate layer is a lipid layer (elected species).

96. (NEW) A method of forming an implantable tissue construct for replacement for a human body part, comprising:

- a) forming an inert material into a porous support structure having a shape and size corresponding to the shape and size of the human body part to be replace;

- b) enclosing the entire porous support structure within a contiguous boundary layer of cell-impermeable material;

- c) providing the porous support structure with at least one inlet;

- d) introducing living cells into the porous structure;

- e) promoting cell growth within the porous support structure by introducing nutrients and oxygen to the living cells, so that the cells conform to the size and shape of the porous support structure; and

- f) removing the boundary layer; thereby producing an implantable tissue construct which corresponds to the shape and size of the human body part to be replaced.

97. (NEW) The method according to claim 87, further comprising the step of eliminating the porous support structure from the implantable tissue construct.

98. (NEW) The method according to claim 87, further comprising the step of removing the boundary layer (4) from the implantable tissue construct by one of:

- mechanically detaching the boundary layer from the porous support structure,

- solubilizing the porous support structure, and

- vascularizing the porous support structure, and

- prevascularizing the porous support structure .

99. (NEW) The method according to claim 87, further comprising the step of introducing a plurality of the porous support structures (1) into a nutrient solution to facilitate cell growth.

100. (NEW-WITHDRAWN) The method according to claim 90, further comprising the steps of forming the boundary layer (4) from an alginate which is polymerized in a calcium chloride solution and, after formation of the cell layer, removing the boundary layer (4) from the porous support structure (1) by dissolving the porous support structure (1) with a low-calcium solution.

101. (NEW-WITHDRAWN) The method according to claim 90, further comprising the step of forming the boundary layer (4) from an overgrowth of cells which forms a membrane.

102. (NEW-WITHDRAWN) The method according to claim 90, further comprising the step of forming the boundary layer (4) from one of cartilage cells, fibroblasts, osteoblasts and chondrocytes.

103. (NEW-WITHDRAWN) The method according to claim 87, further comprising the step of pressuring the porous support structure (1) via one of a liquid and a gaseous medium.

104. (NEW-WITHDRAWN) The method according to claim 103, further comprising the step of inserting the support structure (1) into a container (14) containing one of the liquid medium and the gaseous medium so as to pressurize the porous support structure (1).

105. (NEW-WITHDRAWN) The method according to claim 103, further comprising the steps of placing a protective film (20) around the support structure (1) to form a pressure chamber around the support structure (1), and pressurizing an exterior of the protective film (20).

106. (NEW-WITHDRAWN) The method according to claim 87, further comprising the steps of incorporating the porous support structure (1) into a nutrient circuit (11) and connecting the porous support structure (1) to an oxygen source.

107. (NEW-WITHDRAWN) The method according to claim 106, further comprising the step of connecting the porous support structure (1) to a nutrient reservoir (13) communicating with the nutrient circuit (11).

108. (NEW-WITHDRAWN) An apparatus for forming one of an implant and a prosthesis, the apparatus comprising:

a porous support structure formed from a material inert to living cells, the porous support structure having a shape and a size corresponding to a shape and size of a human body part to be replaced, and the porous support structure having an inlet and an outlet;

a boundary layer, formed from a material impervious to living cells, being applied the porous support structure;

at least one cell layer being formed by introducing the living cells to the support structure;

a source of at least one of nutrients and oxygen communicating with the inlet of the porous support structure for promoting cell growth; and

an instrument for removing the boundary layer, following formation of one of the implant and the prosthesis, thereby resulting in one of the implant and the prosthesis formed from the porous support structure and the living cells in which one of the implant and the prosthesis has the shape and the size which corresponds to the shape and the size of the human body part to be replaced.

109. (NEW-WITHDRAWN) The apparatus according to claim 108, wherein a nutrient circuit (11) communicates with the inlet and the outlet of the porous support structure for supplying the nutrients and the oxygen to the at least one cell layer in order to promote cell growth.

110. (NEW-WITHDRAWN) The apparatus according to claim 108, wherein the support structure (1) is formed into a shape of a vertebra having a desired size.

111. (NEW-WITHDRAWN) The apparatus according to claim 108, wherein the support structure (1) is formed into a shape of a bone part having a desired size.

112. (NEW-WITHDRAWN) The apparatus according to claim 108, wherein a container (14), with at least one pressure connection (17) for connection to a pressure source (19), houses the porous support structure for applying a pressure thereto.